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THE DISTRIBUTION OF THE INTRODUCED PINE SAWFLY
ALONG THE BLUE RIDGE PARKWAY, N.C.



SOUTHEASTERN AREA, STATE & PRIVATE FORESTRY
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COVER PHOTO

Pheromone Trap

THE DISTRIBUTION OF THE INTRODUCED PINE SAWFLY ALONG THE BLUE RIDGE PARKWAY

by

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ABSTRACT

In 1977, an infestation of the introduced pine sawfly was discovered near Linville Falls, North Carolina. Field population census of cocoons and an aerial survey of the area were able to detect areas of heavy infestation only. This paper reports on the use of a sex attractant extracted from virgin females as a survey tool. The pheromone trapped male sawflies along approximately 100 miles of the Blue Ridge Parkway in North Carolina.

INTRODUCTION

The introduced pine sawfly, Diprion similis (Hartig), was introduced into New England in the early 1900's. It has since become established across the Northern Tier States to Wisconsin and across southern Canada. In 1977, an infestation on white pine was detected by the North Carolina Forest Service in the southern Appalachians (Doggett, 1978).

The favored host of this defoliator is eastern white pine, Pinus strobus (L.). Repeated defoliation of white pine results in growth loss, dieback, deformity, and mortality (Coppel and Benjamin, 1965). Trees weakened by defoliation are more susceptible to secondary invasion by insects and diseases. With sawtimber volume of eastern white pine in this area exceeding 3.5 MMBF and growing stock approaching 1 million ft.³, the insect poses a serious threat to an important component of the southern Appalachian forest. In

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addition, white pine is highly valued as an aesthetic species for scenic and recreation areas. It is also an important species of numerous Christmas tree plantations throughout the South.

In order to affectively institute pest management programs and determine resource needs, the severity and extent of the infestation must be accurately delineated. A prepupal cocoon survey in December 1978 (Barry et al., 1979) and an aerial detection survey in March 1979 (Carothers, 1979) were able to detect areas of heavy defoliation but were unable to locate moderate to low level populations.

The attractiveness of a potent sex pheromone produced by virgin female is well known and lends itself to use as a survey tool (Coppel et al., 1960). Virgin females in the field attract large numbers of males. The distance from which males can be attracted is not known, but they have been drawn from the forest into an open field from a distance of 200 feet. However, in an operational survey over extensive area, the use of live virgin females for trapping purposes is both labor and time intensive. Since the female lives only 5 to 7 days, and the varied time of eclosion governs its availability, a sufficient number of females cannot always be obtained.

Procedures developed by Wisconsin researchers indicate that an active material obtained in the laboratory from virgin females can be used for survey purposes (Casida et al., 1963; Jones et al., 1965). This process provides the surveyor with a material more manipulatable than live insects, reduces labor and time required, and is able to detect moderate and low level populations.

METHODS

In the winter of 1979, several thousand prepupal cocoons were collected by Forest Insect and Disease Management and the North Carolina Division of Forestry, and reared out to obtain virgin females. Females were frozen upon emergence and the pheromone was extracted according to a method described by Jewett (1978).

The amount of pheromone placed in dental wicks for use as a lure is expressed as a fraction of the material obtained from the total number of sawflies used for the extraction. A sawfly equivalent or "SFE" is defined as that fraction representing a single female (Casida et al., 1963). Each dental wick contained 10 SFE.

Wicks were placed in the center of Pherocon® II traps (Zoecon Corp. Palo Alto, Calif) and placed at approximate 10 mile intervals along the Blue Ridge Parkway from mile post 180 to 469. After 10 days of exposure, traps were examined and the number of trapped males was recorded.

RESULTS

Male sawflies were recovered from traps placed between mile posts 239 and 330 (Fig. 1). The range of catches was from 1 to 52. The effectiveness of the trap increased inversely with the distance from a white pine stand. Earlier investigations into the effectiveness of the pheromone indicated that a larger number of males is captured in traps placed closest to infested white pine stand. This is evident in the trap at mile post 320, which is between the two traps having highest catches. The nearest white pine stand was two-tenths of a mile from the trap at mile post 320, though there were high populations of sawflies on adjacent traps at mile post 310 and mile post 330. The limited range of pheromone attraction suggests that traps should be placed near the host species.

RECOMMENDATIONS

1. Another survey should be conducted in the late summer during the emergence of the last generation to determine the rate of spread and to better delineate the edges of the infestation.
2. To be most effective, traps should be placed at the edge of, or in white pine stands.
3. Investigation into the longevity of attractiveness of the pheromone should be conducted.

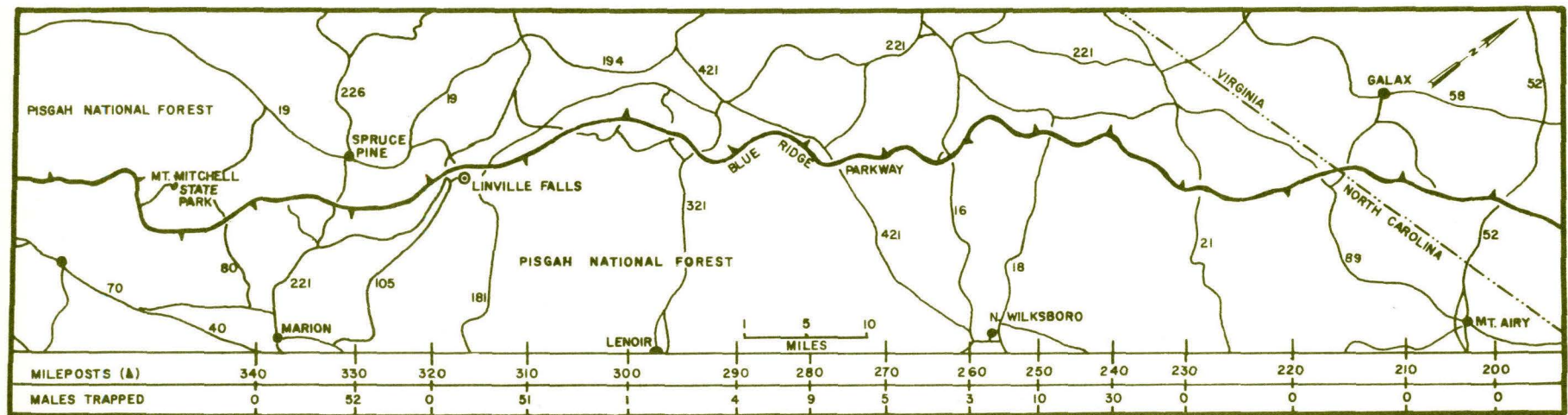


Figure 1. Location of pheromone traps and number of male sawflies caught on the Blue Ridge Parkway, May 1979.

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